

PATENT ABSTRACTS OF JAPAN

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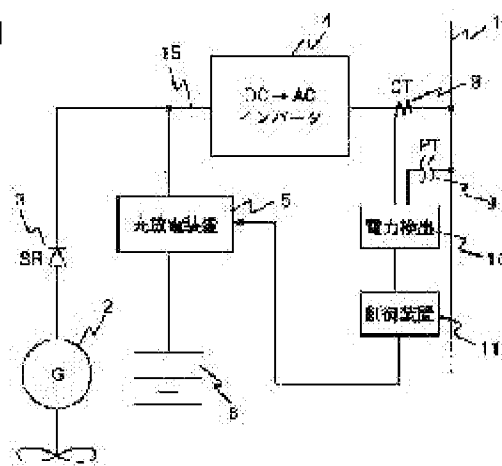
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(54) WIND POWER GENERATING EQUIPMENT

(57)Abstract:

PROBLEM TO BE SOLVED: To generate the nearly constant power independently of a change of wind speed by combining NaS batteries having an instantaneous capacity at a specified number times of the standard deviation value of the generated output and a charging and discharging time capacity of a specified time as a changing cycle of the average weather, and controlling charge and discharge of the NaS batteries.

SOLUTION: A synchronous generator type wind power generator 2 is connected to a power system 1 through a rectifier 3 and a DC/AC converter 4 so as to form a power supply system 15, and NaS batteries 6 are connected in parallel with this power system 15 through a charging and discharging device 5. As this NaS battery 6, an NaS battery having an instantaneous capacity at 1-2 times of the standard deviation value of the generated output obtained on the basis of the mean wind speed through year at a location of the wind power generating equipment, generated output, and fluctuation of the wind speed through year and unevenness of the generated output, and having a charging and discharging time capacity at 4-8 hours as a changing cycle of the average weather is used. Fluctuation of the generated output can be thereby compensated.



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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention relates to wind-power-generation equipment.

[0002]

[Description of the Prior Art]In JP,9-189285,A. In the wind-power-generation equipment which has sent out the generated output which obtained the rotational output of the windmill by changing it into electric power to power-transmission wires and service wires. By changing into the alternating current power of commercial frequency the electric power which stored electricity the storage battery beforehand when a windmill carried out a quick stop by the operation of a brake, etc., emitting it, and dwindling the discharge in fixed time. The wind-power-generation equipment possessing the output rapid decrease arrester which has the function to prevent ***** in which the sending-out electric power to these power-transmission wires and service wires decreases rapidly is indicated.

[0003]In JP,9-324740,A Consider as supply alternating current power obtained by transmitting to a dynamo via the speed-increasing gear which wings are rotated [speed-increasing gear] by the wind force and makes this rotation accelerate to electric power system or a power loading system, and. In the wind power generator which supplies ***** alternating current power to said electric power system or a power loading system at a Diesel engine generator, The system which once sends the ac output of said dynamo to a rechargeable battery via exchange 1 direct current transducer, Establish the bypass system which supplies the dc output of said rechargeable battery to said electric power system or a power loading system via a dc/ac converter, and The ac output of said dynamo, Form the output detectors which detect the ac output of said Diesel engine generator, and the ac output of said dc/ac converter, respectively, and input each of these output detectors, respectively, and. Input the dc output of said rechargeable battery and the load-sharing device which detects that the sum total ac output of said dynamo and said Diesel engine generator exceeded the demand of adjournment electric power system or power loading systems is formed, When it detects that said sum total

ac output exceeded the demand of said electric power system or power loading systems with said load-sharing device, the output of said dynamo is stored in said rechargeable battery via said ac/dc converter, And when said sum total ac output declines, the dc output of said rechargeable battery is supplied to said electric power system or a power loading system via said dc/ac converter, and the wind power generator lessening the ac output from said Diesel engine generator is indicated.

[0004]

[Problem(s) to be Solved by the Invention]While wind power generation is clean energy, generated output changes with change of a wind speed irregularly. In small-scale systems, such as a detached island, even if it becomes a demand-and-supply balance top problem, and it links with a big-electric-power system, while becoming the turbulence same not a little as a load change, it also becomes a factor which generates the especially big voltage variation at the end of a power distribution system.

[0005]In the wind-power-generation equipment provided with the aerogenerator, an object of this invention is to enable it to compensate the wind-power-generation power variation by dispersion in the annual mean wind in the installation point of wind-power-generation equipment, the generated output according to it and the wind speed changed through every year, and the generated output according to it.

[0006]

[Means for Solving the Problem]this invention installs a NaS cell side by side -- a long life of a NaS cell, and many frequency -- it provides combining a NaS cell of suitable capacity to compensate a wind-power-generation power variation by changing a wind speed a short cycle of about ten or less minutes taking advantage of the feature of being chargeable and dischargeable, and having made change of electric power system small has the feature.

[0007]This invention specifically provides a device lifted next.

[0008]In wind-power-generation equipment with which this invention was provided with an aerogenerator connected to electric power system, A standard deviation value twice [one to] the instant capacity of a wind-power-generation power variation is used, and wind-power-generation equipment constituted including a charging and discharging device which performs charge and discharge using a NaS cell which has a cycle twice [one to] the charge-and-discharge-time capacity of compensating desirably, and this NaS cell is provided.

[0009]This invention provides further wind-power-generation equipment in which said charging and discharging device is a reversible converter.

[0010]This invention provides wind-power-generation equipment with which an inverter is further allocated between said charging and discharging device and electric power system.

[0011]

[Embodiment of the Invention]Hereafter, one example concerning this invention is described

based on a drawing.

[0012]Drawing 1 is a block diagram showing the example of this invention. In a figure, the synchronous generator form aerogenerator 2 is connected to the electric power system 1 via the rectifier 3 and the DC/AC converter (DC -> AC inverter) 4, and the generated electric power is supplied to the electric power system 1.

[0013]drawing 2 -- a certain observation point -- the annual wind-speed incidence to kick is shown. Annual average wind speed was 4.9 m/s.

[0014]Drawing 3 shows one example of the standard deviation value in the case of being shown in drawing 2 with the relation between the incidence and a generator output (kw). In the case of this example, average value is 4.9 m/s, and a standard deviation value is set to 2.56 and it is set to 5.12 those twice. The generator output in 2.56 standard deviation values serves as 135kw, and the generator output in 5.12 points which are twice the standard deviation place serves as 281kw. Since the generator outputs in average value are 45kw, they will adopt the NaS cell which has the instant capacity of $281-45=236\text{kw}$ and $135-45=90\text{kw}$. Then, this invention is based on the standard deviation value of the generated output which can be found from dispersion in the annual mean wind in the installation point of wind-power-generation equipment, the generated output according to it and the wind speed changed through every year, and the generated output according to it, it considered it not being concerned with change of a wind speed, but considering it as the generated output of about 1 law as the wind-power-generation equipment by which it was characterized by combining with the NaS cell which has the instant capacity of 1-2 twice of the standard deviation value of this generated output, and the charge-and-discharge-time capacity of 4 to 8 hours which is a change cycle of average weather, and performing charge and discharge control.

[0015]in addition to the above-mentioned composition, when strong wind-speed time became long, it was considered as the wind-power-generation equipment which is not concerned with change of a wind speed but is made into the generated output of about 1 law by blade angle degree control or the revolving speed control of a dynamo after checking that the charge of a NaS cell is in a maximum.

[0016]In drawing 1, the voltage transformer 9 is formed in the current transmission 8 and the electric power system 1 at the supplying system 15, electric power is detected with the power detection machine 10 based on those measurement values, and as electric power becomes fixed with the 1 electric-power constant control device 11, the charge and discharge of a charging and discharging device are made. In the case of this example, the synchronous generator form aerogenerator 2 is adopted, and a system configuration can be made brief, but this invention is not limited to this.

[0017]In drawing 1, the voltage transformer 9 is formed in the current transmission 8 and the electric power system 1 at the supplying system 15, electric power is detected with the power

detection machine 10 based on those measurement values, and as electric power becomes fixed with the 1 electric-power constant control device 11, the charge and discharge of a charging and discharging device are made. In the case of this example, the synchronous generator form wind-force machine 2 is adopted, and a system configuration can be made brief, but this invention is not limited to this.

[0018]Drawing 4 is an aerogenerator output figure showing a wind speed and the situation where an output changes with progress of time.

[0019]Drawing 5 is other examples of an aerogenerator output figure.

[0020]Drawing 6 shows the surveyed wind speed (m/s) in 0 to 5 hours, and a half of wind-power-generation equipment, and drawing 7 shows 5 hours, a half - the wind speed (m/s) in 11 hours.

[0021]Drawing 8 is a block diagram about other examples of this invention. It is fundamentally [as the 1st example] the same, and the same number is given to the same composition. In the case of this example, the induction generator form aerogenerator 12 is adopted, and the charging and discharging device 5 is constituted by the reversible converter (DC-> AC inverter, a DC<-AC converter) 7.

[0022]

[Effect of the Invention]By according to this invention, combining with the NaS cell which has the instant capacity of 1-2 twice of the standard deviation value of generated output, and the charge-and-discharge-time capacity of 4 to 8 hours which is a change cycle of average weather, and performing charge and discharge control, the wind-power-generation equipment not being concerned with change of a wind speed but considering it as the generated output of about 1 law can be provided.

[0023]in addition to the above-mentioned composition, when strong wind-speed time becomes long, the wind-power-generation equipment not being concerned with change of a wind speed but considering it as the generated output of about 1 law by the angle control of a braid or the revolving speed control of a dynamo can be provided after checking that the charge of a NaS cell is in a maximum.

[Translation done.]